

Ho Huu Binh

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INTERESTS

As a master student specializing in Statistics, I harbor a profound aspiration to broaden my research and captivate my interest in the intricate domains of statistics, machine learning, and forecasting. Possessing an unyielding eagerness to contribute to a multidisciplinary field, I pledge my utmost dedication to tasks of all magnitudes.

My general research interest lies in the areas of time series forecasting and tabular modelling, encompassing probabilistic generative modeling, approximate inference, supervised/unsupervised learning, and representation learning.

EDUCATION

- **University of Science - Vietnam National University** HCMC, Vietnam
MS. Mathematical Statistics; Current GPA: 3.89/4 *Dec 2023 - Current*
- **International University - Vietnam National University** HCMC, Vietnam
BS. Applied Mathematics *Aug 2018 - July 2022*
 - **Thesis title:** Forecasting Unit Sales of Retail Goods using Dynamic Generalized Linear Models
- **Honors and Awards:**
 - **First Prize** - Vietnam National Olympic Econometrics and Application contest (July 2021).
 - **Third Prize** - Scientific Conference for Student in 2021 (Vietnam National University.)

EXPERIENCE

- **FPT Japan - Usee** HCMC, Vietnam
Inventory Optimization and Forecasting (Intern) *July 2021 - November 2022*
 - **Inventory optimization:** Tracked inventories of various pharmaceutical SKUs periodically, proposed simple yet effective daily inventory management policy based on domain insights, and cycle service levels and successfully curbed lost sales resulted from the risk of stock-outs.
 - **Forecasting sales:** Investigated the the zero sales scenarios where the actual demand of such products is positive. Applied AI-driven and statistical models to generate probabilistic forecasts. Successfully reduced forecasting errors (approximately **5%** improvement) and enhanced uncertainty quantification which in turn minimized chance of biased forecasts and augmented forecast with a flexible risk management.
- **Manulife** HCMC, Vietnam
Product Development (Intern) *July 2022 - October 2022*
 - **Product specification:** Observed, analyzed and detected cash-flow anomalies. Derived premium rates for critical illness products. Examined quota share treaty for reinsurance while read technical documents and performing quarterly market researches. (All tasks using Excel and R)
 - **Data fetching:** Performed SQL queries to retrieve requested data from data lake.

TYPICAL PROJECTS

- **Deep Portfolio Allocation (November 2023):** Investigated the efficacy of deep learning model specifically designed for sequential data to the portfolio optimization problem. Validated the findings of the paper of Hieu K. Cao and Binh T. Nguyen's paper on the superior performance of simple autoregressive models equipped with an integrated attention mechanism. Achieved **23%** increase in the Sharpe ratio compared to equally weighted portfolio.
- **Forecasting Sales and Demand Planning of Retail Goods (July 2022 - Present):**
 - Inspected the efficiency of some notable classical time series models with large and high-granularity data sets. Applied a novel, scalable, expeditious forecasting process equipped with machine learning and deep learning frameworks and **business-oriented metrics** for all types of data patterns. Successfully improved nearly **42%** in forecasting accuracy over the classical time series models. Designed simple and easy-to-optimize replenishment strategies for inventory problems. Reduced the number of deliveries from warehouses. Achieved storage utilization nearly **100%** with no stock-out incidents.

- Continually reproduced and benchmarked up-to-date forecasting methods in recent academic literature to assess and probe the efficacy of these models in real-world settings.
- **Black-Litterman portfolio optimization with Copulas and RNN-derived views (July 2023):** Applied classical Black-Litterman model to incorporate investors' views to portfolio construction under Bayesian paradigm with a modification of using Copula-based covariance matrix instead of historical counterpart. Deduced investors' views from LSTM models with Price-Volume and Fundamental covariates. Performed nearly **5%** better than the original Black-Litterman, **15%** better than the max-Sharpe method, and outperforming the market by **12%**.
- **NLP: Multi-label Text Classification To Categorize Bank Transactions Descriptions (June 2023)** Applied PhoBERT to categorize over twenty classes for bank transaction descriptions. Achieved **90%** accuracy and nearly **0.80** f1-score on new data, suggesting the model may generalize well.
- **Customer Churn Analysis (Feb 2022):** Executed comprehensive EDA to decipher data patterns and relationships. Exercised Feature Engineering encompassing preprocessing and feature selection. Deployed advanced machine learning models with tuning for precise and business-oriented attrition predictions with robust performance (recall score exceeding **0.92** and ROC AUC surpassing **0.80**). **Well-calibrated** model predictions to enhance decision-making reliability. Implemented **Survival Analysis** for the accurate prediction of the Lifetime Value (LTV) of customers to gauge customers' loyalty and income-generating capability
- **Incorporating Deep Learning In Predicting Risk In Vietnam Financial Market (Nov 2021):** Modelling conditional volatilities and forecasting Value at Risk (NeuralNet - GARCH). Comparing with the traditional model (ARIMA-GARCH) and coming up with nearly a **62%** enhancement in mean distance error of VaR **99%**.
- **Maximal Predictability Portfolio Optimization (Feb 2021):** Created an investment portfolio that can capture the market predictability (in terms of stocks' returns) and circumvented forecasting errors. Employing Mean Absolute Deviation transformation approach to solve a non-convex fractional quadratic programming problem. A **6%** increase in investment efficiency compared to the traditional model (Mean-Variance model).

PUBLICATIONS

- Bao Q. Ta *, Vu T. Huynh, Khai Q H. Nguyen, Phung N. Nguyen and **Binh H. Ho** - **Maximal predictability portfolio optimization model and applications to Vietnam stock market** - "Studies in Systems, Decision and Control" Series - "Credible Asset Allocation, Optimal Transport Method and Related Topics", ISSN 2198-4182, Springer 2022 (The 15th International Conference of The Thailand Econometric Society - TES)

SKILLS

- **Deep/Machine learning Framework** (PyTorch, scikit-learn, Pyro, PyMC3, Git), **Data wrangling** (Pandas), **Forecasting** (Nixtla, Darts, GluonTS, PyTorchTS), **Optimization** (GUROBI, CVXPY, Pulp, OR-Tools), **Visualization**(matplotlib, ggplot2), **R** (tidyverse, caret), **SQL**, Statistical Modelling, Machine Learning